

question, however, it struck me that the same results might be obtained by other means than colour, and experiments were undertaken with a large series of gum resins and other oxidised hydrocarbons (added to ordinary collodion), some colourless and some not. With every gum resin was obtained a considerable extension of the photographic spectrum below the lines *b*, and at length I procured a resin forming with silver a perfectly white compound that seems to be capable of taking an image far below the line *A*. At present, I find that the longer the exposure given, the greater the length of the spectrum impressed, and I believe that, with patience, a very large part of the absorption-lines lying beyond that point may be registered, as I have obtained impressions which are constant in each plate exposed. The past winter has been of a most unsatisfactory nature for this kind of work, and it is only at long intervals that I have been enabled to catch the Sun for this purpose. I am earnestly looking forward to brighter sunshine, when I have not the least doubt that I shall obtain sharp fiduciary lines in the ultra-red. The addition of any colour to the preparations has been anything but beneficial, retarding the action greatly; and, from what is apparent, the virtue of the dyes used consists simply in the fact that they are hydrocarbons of some kind, probably combined with the faint traces of silver always left in the film of the sensitive plate.

Experiments with potassium bichromate have also been undertaken; and the result shows that (where partially insolated) the rays which usually have no effect on the sensitive compound are capable of continuing the action set up, as I pointed out in the year 1872. Iron and uranium have also yielded prolonged spectra.

The first experiments were carried out with a single prism of 60° , and a lens to the camera of 4-feet focus; the later experiments have been made with a direct-vision spectroscope of 9 prisms, being equivalent to about three single prisms, and with 4 prisms in battery. The same camera and object-glass have been employed.

Observations of Coggia's Comet. By G. H. With, Esq.

During July 1874 I made numerous observations of Coggia's Comet, with Newtonian telescopes furnished with silvered-glass specula, of aperture varying from $8\frac{1}{2}$ to $12\frac{1}{4}$ inches.

Notes of *three* of these observations may not prove uninteresting to the Fellows of the Society.

I also send copies of three sketches, made within a few hours of the time of each observation.

July 8, 1874, 10.30 P.M. I observed Coggia's Comet with an $8\frac{1}{2}$ -in. aperture Newtonian, furnished with a silvered-glass speculum, and power $125\pm$. The nucleus was small and bright, with a fan-shaped jet of about $130^\circ\pm$ issuing from it. The envelope and coma were sharply defined at their outer edges; the central axis of the coma appeared almost black, with a fairly defined boundary.

I would direct special attention to the following fact:

A remarkable oscillatory motion of the fan-shaped jet, upon the nucleus as a centre, occurred at intervals of from 3 to 8 seconds \pm .

The fan seemed to "tilt over" from the preceding towards the following side, and then, for an instant, appeared sharply defined and fibrous in structure. Suddenly it became nebulous, all appearance of structure vanished, and the outline became merged in the surrounding matter.

At the moment of this change a pulsation was transmitted from the head through the coma, as though luminous vapour had been projected from the former into the latter.

These phenomena were observed many times during the evening, both by myself and a well-trained optical assistant.

They were not "glimpsed," but easily and most unmistakably seen.

July 11, 10.30 P.M. $12\frac{1}{4}$ -in. speculum; powers 90 to $300\pm$. A singular change had taken place in the shape of the jet proceeding from the nucleus. A spiral tendency appeared to have been developed in it; the fibrous structure was most distinct; also the width of the coma had increased. No oscillation as on the 8th was perceptible.

July 14, 1874, 10.30 P.M. (*see sketch*). $8\frac{1}{2}$ -in. speculum; powers 125 to $300\pm$. On this occasion the nucleus was very bright and sharply defined.

The jet had resumed its fan-like shape, but was now enriched with a broad, well-defined border of condensed light. The envelope extended only a very small distance beyond the arc of the fan, which included, as on July 8, about 135° .

But above the primary envelope, and quite separate from it, were three faintly luminous, flocculent clouds of cometary matter symmetrically arranged and well defined in shape, though fading into blackness at the edges.

After this evening the observations presented no points of special interest. The oscillation of the jet was seen only on the 8th.

Hereford, 1875, Nov.